This listing of claims will replace all prior versions, and listings, of claims in the application.

Claims

What is claimed is:

What is claimed is:

1. (Original) A method of forming a tubular liner within a preexisting structure, comprising:

positioning a tubular assembly within the preexisting structure; and

radially expanding and plastically deforming the tubular assembly within the preexisting structure;

wherein, prior to the radial expansion and plastic deformation of the tubular assembly, a predetermined portion of the tubular assembly has a lower yield point than another portion of the tubular assembly.

2 (Currently Amended). ~~The method of claim 1, wherein the predetermined portion of the tubular assembly has a higher ductility and a lower yield point prior to the radial expansion and plastic deformation than after the radial expansion and plastic deformation.~~ An expandable tubular member comprising a steel alloy comprising, by weight percentage: 0.065 to 0.08 % C, 0.82 to 1.44 % Mn, 0.006 to 0.02 % P, 0.001 to 0.004 % S, 0.24 to 0.45 % Si, up to 0.05 % Cu, 0.01 to 9.1 % Ni, and 0.02 to 18.7 % Cr.

3. (Currently Amended) ~~The method of claim 1, wherein the predetermined portion of the tubular assembly has a higher ductility prior to the~~ An expandable tubular member, wherein a yield point of the expandable tubular member is at most about 46.9 to 57.8 ksi prior to a radial expansion and plastic deformation ~~than~~; and wherein the yield point of the expandable tubular member is at least about 65.9 to 74.4 ksi after the radial expansion and plastic deformation.

4. (Currently Amended) ~~The method of claim 1, wherein the predetermined portion of the tubular assembly has a lower yield point prior to the~~ An expandable tubular member, wherein a yield point of the expandable tubular member after a radial expansion and plastic deformation ~~than after~~ is at least about 5.8 to 40% greater than the yield point of the expandable tubular member prior to the radial expansion and plastic deformation.

5. (Currently Amended) ~~The method of claim 1, wherein the predetermined portion of the tubular assembly has a larger inside diameter after the~~ An expandable tubular member,

wherein an anisotropy of the expandable tubular member, prior to a radial expansion and plastic deformation ~~than other portions~~ of the expandable tubular ~~assembly~~ member, is at least about 1.04 to 1.92.

6. (Currently Amended) ~~The method of claim 5, further comprising:~~

~~positioning another tubular assembly within the preexisting structure in overlapping relation to the tubular assembly; and~~

~~radially expanding and plastically deforming the other tubular assembly within the preexisting structure;wherein, prior to the~~ An expandable tubular member, wherein an expandability coefficient of the expandable tubular member, prior to a radial expansion and plastic deformation of the ~~tubular assembly, a predetermined portion of the other tubular assembly has a lower yield point than another portion of the other tubular assembly~~ expandable tubular member, is greater than 0.12.

7. (Currently Amended) ~~The method of claim 6, wherein the inside diameter of the radially expanded and plastically deformed other portion of the tubular assembly is equal to the inside diameter of the radially expanded and plastically deformed other portion of the other tubular assembly.~~ An expandable tubular member, wherein an expandability coefficient of the expandable tubular member is greater than the expandability coefficient of another portion of the expandable tubular member.

8. (Currently Amended) ~~The method of claim 1, wherein the predetermined portion of the tubular assembly comprises an end portion of the tubular assembly.~~ An expandable tubular member wherein the expandable tubular member has a higher ductility and a lower yield point prior to a radial expansion and plastic deformation of the expandable tubular member than after the radial expansion and plastic deformation of the expandable tubular member.

Claims 9-126 Canceled.

127. (Original) A method of radially expanding and plastically deforming a tubular assembly comprising a first tubular member coupled to a second tubular member, comprising:

radially expanding and plastically deforming the tubular assembly within a preexisting structure; and

using less power to radially expand each unit length of the first tubular member than to radially expand each unit length of the second tubular member.

Claims 128-134 Canceled.

135. (Original) A method of manufacturing a tubular member, comprising:

processing a tubular member until the tubular member is characterized by one or more intermediate characteristics;

positioning the tubular member within a preexisting structure; and

processing the tubular member within the preexisting structure until the tubular member is characterized one or more final characteristics.

Claims 136-141 Canceled.

142. (Original) An apparatus, comprising:

an expandable tubular assembly; and

an expansion device coupled to the expandable tubular assembly;

wherein a predetermined portion of the expandable tubular assembly has a lower yield point than another portion of the expandable tubular assembly.

Claims 143-193 Canceled.

194. (Original) A method of determining the expandability of a selected tubular member, comprising:

determining an anisotropy value for the selected tubular member;

determining a strain hardening value for the selected tubular member; and

multiplying the anisotropy value times the strain hardening value to generate an expandability value for the selected tubular member.

Claims 195-198 Canceled.

199. (Currently Amended) A method of radially expanding and plastically deforming tubular members, comprising:

selecting a tubular member;

determining an anisotropy value for the selected tubular member;

determining a strain hardening value for the selected tubular member;

multiplying the anisotropy value times the strain hardening value to generate an expandability value for the selected tubular member; and

if the ~~anisotropy~~expandability value is greater than 0.12, then radially expanding and plastically deforming the selected tubular member.

Claims 200-204 Canceled.

205. (Original) A radially expandable tubular member apparatus comprising:

a first tubular member;

a second tubular member engaged with the first tubular member forming a joint; and

a sleeve overlapping and coupling the first and second tubular members at the joint;

wherein, prior to a radial expansion and plastic deformation of the apparatus, a predetermined portion of the apparatus has a lower yield point than another portion of the apparatus.

Claims 206-309 Canceled.

310. (Original) A method of joining radially expandable tubular members comprising:

providing a first tubular member;

engaging a second tubular member with the first tubular member to form a joint;

providing a sleeve;

mounting the sleeve for overlapping and coupling the first and second tubular members at the joint;

wherein the first tubular member, the second tubular member, and the sleeve define a tubular assembly; and

radially expanding and plastically deforming the tubular assembly;

wherein, prior to the radial expansion and plastic deformation, a predetermined portion of the tubular assembly has a lower yield point than another portion of the tubular assembly.

Claims 311-515 Canceled.

516. (Currently Amended) An expandable tubular ~~assembly, comprising:~~

~~a first tubular~~ member;

~~a second tubular member coupled to the first tubular member;~~

~~a first threaded connection for coupling a portion of the first and second tubular members;~~

~~a second threaded connection spaced apart from the first threaded connection for coupling another portion of the first and second tubular members;~~

~~a tubular sleeve coupled to and receiving end portions of the first and second tubular members; and~~

~~a sealing element positioned between the first and second spaced apart threaded connections for sealing an interface between the first and second tubular member;~~

~~wherein the sealing element is positioned within an annulus defined between the first and second tubular members; and~~

~~wherein, prior to a radial expansion and plastic deformation of the assembly, a predetermined portion of the assembly has a lower yield point than another portion of the apparatus.~~ wherein the carbon content of the tubular member is less than or equal to 0.12 percent; and wherein the carbon equivalent value for the tubular member is less than 0.21 to 0.36.

Claims 517-666 Canceled.

667. (Currently Amended) A method of selecting tubular members for radial expansion and plastic deformation, comprising:

selecting a tubular member from a collection of tubular member;

determining a carbon content of the selected tubular member;

determining a carbon equivalent value for the selected tubular member; and

if the carbon content of the selected tubular member is less than or equal to 0.12 percent and the carbon equivalent value for the selected tubular member is less than ~~0.21, then determining that the selected tubular member is suitable for radial expansion and plastic deformation.~~ 0.21 to 0.36, then determining that the selected tubular member is suitable for radial expansion and plastic deformation.

Claims 668-672 Canceled.

673. (Original) An expandable tubular member, comprising:

a tubular body;

wherein a yield point of an inner tubular portion of the tubular body is less than a yield point of an outer tubular portion of the tubular body.

Claims 674-728 Canceled.

729. (Original) A method of manufacturing an expandable tubular member, comprising:

providing a tubular member;

heat treating the tubular member; and

quenching the tubular member;

wherein following the quenching, the tubular member comprises a microstructure comprising a hard phase structure and a soft phase structure.

Claims 730-757 Canceled.

758. (Original) A method for manufacturing an expandable tubular member comprising:

providing a tubular member;

heat treating the tubular member;

quenching the tubular member; and

cold working the tubular member, whereby upon cold working, the yield strength of the tubular member is increased.

Claims 759-760 Canceled.

761. (Original) A method for expanding an expandable tubular member comprising:

providing a tubular member;

lubricating the tubular member; and

expanding the tubular member.

Claims 763 Canceled.

763. (Original) A method for formability evaluation comprising:

selecting a first tubular member;

measuring a plurality of stress and strain property parameters for the first tubular member;

measuring a Charpy V-notch impact value parameter for the first tubular member;

measuring a stress rupture parameter for the first tubular member;

measuring a strain hardening exponent parameter for the first tubular member;

measuring a plastic strain ratio parameter for the first tubular member;

comparing the parameters measured for first tubular member to a

plurality of desired parameters; and

selecting the first tubular member to manufacture an expandable tubular member if the measured parameters meet or exceed the desired parameters.

Claims 764-766 Canceled.

767. (Original) An expandable tubular member comprising:

a tensile strength in the range of 60 ksi to 120 ksi;

a yield strength in the range of 40 ksi to 100 ksi;

a yield strength to tensile strength ratio in the range of 50% to 85%;

a minimum elongation change due to radial expansion of 35%;

a minimum width reduction due to radial expansion of 40%;

a minimum thickness reduction due to radial expansion of 30%; and

a minimum anisotropy of 1.5.

Claims 768-769 Canceled.

770. (Currently Amended) A method for transforming the yield strength of an expandable tubular member comprising:

providing a manufactured tubular member;

~~cold rolling the tubular member;~~ inter-critical annealing the tubular member;

radially expanding and plastically deforming the tubular member; and

heating the tubular member.

Claims 771-774 Canceled.

775. (Currently Amended) An expandable tubular member comprising:

a tensile strength in the range of 60 ksi to 120 ksi;

a yield strength in the range of 40 ksi to 100 ksi;

a yield strength to tensile strength ratio in the range of 50% to 85%;

a minimum elongation change due to radial expansion of 22% to 35%;

a minimum width reduction due to radial expansion of 30% to 40%;

a minimum thickness reduction due to radial expansion of 30% to 35%; and

a minimum anisotropy of 0.8 to 1.5.

Claims 776-778 Canceled.

779. (Original) An expandable tubular member comprising:
a yield strength of approximately 77 ksi;
a tensile strength of approximately 83 ksi; and
an elongation of approximately 32%.

780. (Original) An expansion device comprising:
a surface;
a self lubricating hard coating on the surface; and
a self lubricating soft coating on the surface.

Claims 781-788 Canceled.

789. (Original) An expandable tubular member comprising:
a yield strength in the range of 40 ksi to 80 ksi;
a maximum yield strength to tensile strength ratio of 0.5;
a minimum elongation change due to radial expansion of 30%;
a minimum width reduction due to radial expansion of 45%;
a minimum wall thickness reduction due to radial expansion of 30%; and
a minimum anisotropy of 1.5.

790. (Currently Amended) An expandable tubular member comprising:
a friction coefficient between the expandable tubular member and an expansion device of 0.02, whereby the member may be expanded by a force below 100000 lbs.

Claim 791 Canceled.

792. (Currently Amended) An expandable tubular member comprising:
a lubricant resulting in a friction coefficient of ~~0.125~~0.02 to 0.125 between the expandable tubular member and an expansion device;
a wall thickness of approximately 0.305 to 0.5 inches; and
a required expansion force of approximately 126000 lbs to 146000 lbs~~,~~;
wherein the required expansion force allows a diameter to thickness ratio of approximately 15 to 25 and a collapse strength of approximately 2400 ksi.

Claims 793-803 Canceled.

804. (Currently Amended) An expandable tubular member, comprising:
wherein after a 15.6% to 24% radial expansion and plastic deformation,
approximately a 5% to 70% change in yield strength, approximately a ~~25~~3% to 27% change in yield ratio, approximately a ~~67% change in elongation percentage, approximately a 28% change in width reduction percentage, approximately a 7% change in wall thickness reduction percentage, and approximately a75% change in anisotropy~~. 11% to 91% change in elongation percentage, approximately a 8% to 43% change in width reduction percentage, approximately a 2% to 15% change in wall thickness reduction percentage, and approximately a ~~52% change in anisotropy.~~4% to 75% change in anisotropy.

Claims 805-812 Canceled.

813. (Currently Amended) An expandable tubular member comprising:
a tensile strength of approximately 68 ~~ksi before radial expansion;~~
~~a tensile strength of approximately 80 ksi after 16% radial expansion; and~~
~~a tensile strength of approximately 82 ksi after 24% radial expansion.~~ to 115 ksi before radial expansion;
a tensile strength of approximately 80 to 120 ksi after 15.2 to 16 % radial expansion; and
a tensile strength of approximately 82 to 121 ksi after 24 to 25.2 % radial expansion.

Claims 814-816 Canceled.

817. (Currently Amended) An expandable tubular member comprising:
a tensile strength of approximately 100 ~~ksi before radial expansion; and~~
~~a tensile strength of approximately 26 ksi after 31.3% radial expansion.~~ to 114 ksi before radial expansion; and
a tensile strength of approximately 126 to 140 ksi after 15.6 to 31.3 % radial expansion.

Claim 818 Canceled.

819. (Currently Amended) An expandable tubular member comprising:

upon quenching in water at approximately 735 to 775 °C, a tensile strength of 94 ksi and a yield strength of 56 to 59 ksi.

Claims 820-821 Canceled.

822. (Currently Amended) An expandable tubular member comprising:

upon quenching in oil at approximately ~~775~~750 to 820 °C, a tensile strength of 84 to 109 ksi and a yield strength of 49 ~~ksi.~~ to 61 ksi.

Claims 823-824 Canceled.

825. (Original) An expandable tubular member comprising:

by weight percentage, 0.1% C, 1.5% Mn, and 0.3% Si.

Claim 826 Canceled.

827. (Currently Amended) An expandable tubular member comprising:

a yield strength of approximately ~~80~~46 to 90 ksi~~,~~;

a yield strength to tensile strength ratio of approximately ~~0.86,~~ 0.69 to 0.88;

a longitudinal elongation change due to radial expansion of approximately 14.8~~%,~~ to 49.0 %;

a width reduction due to radial expansion of approximately ~~38%, a wall thickness reduction due to radial expansion of approximately 43%, and an anisotropy of approximately 0.87.~~22 to 50 %; a wall thickness reduction due to radial expansion of approximately 20 to 53 %; and

an anisotropy of approximately 0.63 to 1.1.

Claims 828-830 Canceled.

831. (Original) An expandable tubular member comprising:

an elongation change due to radial expansion of approximately 21%~~,~~;

a width reduction due to radial expansion of approximately 35%~~,~~;

a wall thickness reduction due to radial expansion of approximately 38%~~,~~; and

an anisotropy of approximately 0.89.

832. (Currently Amended) An expandable tubular member, upon quenching and tempering,

comprising:

~~a yield strength of approximately 77 ksi, a yield strength to tensile strength ratio of approximately 0.82, a longitudinal elongation change due to radial expansion of approximately 16%, a width reduction due to radial expansion of approximately 32%, a wall thickness reduction due to radial expansion of approximately 45%, and an anisotropy of approximately 0.65.~~ after a flare expansion of 42%~~,~~ to 52%;

an absorbed energy in the longitudinal direction of ~~125,~~ 85 to 145 ft-lbs;

an absorbed energy in the transverse direction of 59 ft-lbs~~,~~; and an absorbed energy in the weld of 174 to 176 ft-lbs.

Claims 833-848 Canceled.